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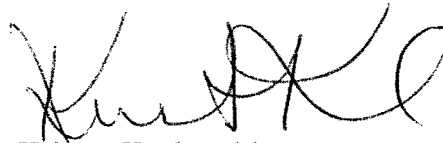
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A handwritten signature in black ink, appearing to read 'Kristen Kochanski', with a stylized, cursive script.

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Characteristics of Living and Deceased Suicidal Military Personnel based on Single
versus Multiple Suicide Attempt Status

Public Health Significance of Suicide-Related Behaviors

While 36,000 Americans died by suicide in 2008, in that same year there was another 1 million suicide attempts (CDC, 2011). The lifetime prevalence of suicide attempts is estimated at 2.7% (Nock, Borges, Bromet, & Cha, 2008). The average rate of a subsequent suicide attempt has been reported to be 15-16% at 1-year and 20-25% over the following years (D. Owens, Horrocks, & House, 2002); as many as 1.8% of individuals who attempt suicide die by suicide in the year following their attempt (D. Owens, et al., 2002). Meta-analytic findings based on standardized mortality ratios from nine studies indicate that suicide attempters are 38 times more likely to die by suicide as compared to those who never attempted suicide (Harris & Barraclough, 1997). With approximately 1 million suicide attempts nationally within one year, the cost to society is astounding. In 2008, there were almost 200,000 hospitalizations due to suicide attempts and another 323,000 emergency department visits (CDC, 2011). For those attempts resulting in hospitalization, the economic cost is estimated at \$9,127 per suicide attempt with an additional \$11,146 for work-loss cost (Yang & Lester, 2007).

The research on suicide attempts in the United States (U.S.) military is startlingly sparse. Until 2008, the military did not have a systematic way to track suicide attempts. Currently, suicide attempts are captured in all branches of service through the Department of Defense Suicide Event Report (DoDSER) system (DoD, 2010). According to a review of civilian and military risk factors for suicide published in 2009, there is no reliable data on suicide attempts within the U.S. military (Martin et al., 2009).

The U.S. Army did report the Army's suicide attempt numbers for Fiscal Year 2009, which equated to 1,713 suicide attempts (Department of the Army, 2010). The DoDSER annual report for calendar year 2010 reported a total of 863 suicide attempts across all branches of service occurring within 837 individual Service Members. While these data are not from the same time period, it seems likely that there is some reporting inaccuracy within either the Department of the Army's statistics or the DoDSER statistics. This inconsistency of reporting is particularly problematic given the significant impact of suicide attempts within the military population. Based on a survey of health related behaviors amongst military members in 2008, 2.1% of Service Members reported making a suicide attempt within the past year, 1.1% reported a suicide attempt while serving in the military, and 2.5% reported making a suicide attempt before joining the service (Bray et al., 2010).

Suicide Prevention and Significance of Tertiary Prevention Efforts

There are three stages of prevention in regard to illness and injury (Green & Kreuter, 2005). The first stage is primary prevention which entails protecting health through environmental controls (Green & Kreuter, 2005). In regard to suicide prevention, this type of prevention would involve a program, such as one within a branch of military service created to promote overall psychological, physical, and spiritual health. Secondary prevention involves determining and treating individuals with known risk factors for illness or injury (Green & Kreuter, 2005), such as treating individuals for depression because it is a known risk factor for eventual death by suicide. Finally, tertiary prevention is treatment to prevent the recurrence of illness or injury (Green &

Kreuter, 2005). Tertiary prevention is the aim of the present study as its purpose is to investigate the factors that are associated with the recurrence of suicide attempts.

Tertiary prevention within the military is critical given the empirical evidence identifying a suicide attempt as one of the most robust and clinically meaningful risk factors for death by suicide (Brown, Beck, Steer, & Grisham, 2000), the extremely high economic cost of suicide attempts, and the high percentage of military members reporting a history of suicide attempt. Additionally, there is substantial evidence suggesting that individuals with multiple suicide attempts present with a more severe clinical picture (e.g., Forman, Berk, Henriques, Brown, & Beck, 2004; Kaslow, Jacobs, Young, & Cook, 2006) and even more critically, individuals with multiple suicide attempts may be at greater risk for death by suicide than those with a single suicide attempt (Christiansen & Jensen, 2007; Hawton & Fagg, 1988; Nordentoft et al., 1993; Weiner, Richmond, Conigliaro, & Wiebe, 2011).

Figure 1. Figure 1 depicts the possible trajectories of an individual who attempts suicide. The possible trajectories encompass (1) individuals who will *die* by suicide after a single attempt; (2) individuals who will *live* after a single attempt without a recurrence of suicide attempt; (3) individuals who will *die* by suicide after having multiple suicide attempts; and (4) individuals who will *live* after their multiple attempts without additional recurrence of suicide attempt.

Review of the Empirical Literature on Suicide Attempts and Subsequent Suicide Death

Unfortunately, this research and future prevention efforts cannot prevent the suicide deaths that have already occurred as depicted by trajectories 1 and 3 in Figure 1,

but we can learn about the path to suicide through their journeys. While there is minimal information directly comparing individuals who have died by suicide after a single attempt (Trajectory 1, Figure 1) with those who have died by suicide after a multiple attempt (Trajectory 3, Figure 1), there have been prospective studies examining whether individuals who have attempted suicide (Trajectory 2, Figure 1) will eventually die by suicide (Trajectory 3, Figure 1).

Prospective studies. Given the importance of suicide attempts in regard to eventual death by suicide, a number of prospective studies have since been conducted to determine the percentages of individuals with a suicide attempt who will go on to die by suicide. Two prospective studies investigated percentages of individuals who went on to die by suicide within four years following a suicide attempt or a self-harm incident. In Denmark, 2.3% of individuals identified in the suicide attempt registry died by suicide within four years (Christiansen & Jensen, 2007). In England, individuals who presented to the emergency department due to deliberate self-harm were 34 times more likely to die by suicide than the general population (Cooper et al., 2005). A similarly designed study in New Zealand found that 4.6% of individuals presenting to the hospital for a suicide attempt, died by suicide within a 10-year follow-up period (Gibb, Beautrais, & Fergusson, 2005).

Other studies have used a longer follow-up period to determine if individuals with a history of suicide attempt will remain at risk for suicide many years after an index attempt. Individuals in Finland who presented to an intoxication unit within a hospital following a suicide attempt by overdose were followed for 37 years. Results indicate that 13.3% of individuals died by suicide during the follow-up period with almost two-thirds

of the deaths occurring within 15 years following the index suicide attempt (Suominen et al., 2004). In another study, 7.8% of individuals hospitalized for either a suicide attempt or suicidal ideation died by suicide within a 30-year follow-up period (Wenzel et al., 2011). There is no clarification regarding whether those who died by suicide had previously been classified in the suicidal ideation group or the suicide attempt group, making the exact percentage of those with a suicide attempt to eventually die by suicide as unclear. Despite this uncertainty, the majority of the sample (70%) had originally been classified in the suicide attempt group (Wenzel, et al., 2011).

Thus, the percentages of death by suicide following a suicide attempt or self-harm event can range based on follow-up length, geography, and study design. Owens, Horrocks, and House (2002) conducted a systematic review of 90 studies involving both suicide and non-fatal self-harm. The review split the studies into follow-up periods of one year, one to four years, four to nine years, and nine or more years and then calculated median proportions for repetition to include death by suicide. Results indicate that at one-year follow-up, 1.8% had died by suicide; 3% had died during one to four year follow-ups; 3.4% during four to nine years; and 6.7% of individuals had died by suicide in studies with nine or more years in the follow-up period (D. Owens, et al., 2002). Altogether, the majority of studies show that up to 15% of individuals with a documented suicide attempt may be expected to die by suicide in the thirty years following the index suicide attempt. The question then becomes, of the individuals who die by suicide, how many have a history of suicide attempt.

Psychological autopsy studies. Psychological autopsy has become a common method for determining specific antecedents occurring before someone dies by suicide,

including the presence or absence of prior suicide-related behaviors (Cavanagh, Carson, Sharpe, & Lawrie, 2003). The psychological autopsy method has been used internationally, allowing information to be gathered about individuals prior to their suicide in locations such as Finland, Sri Lanka, Scotland, China, Hong Kong, Taiwan, New Zealand, the U.S., and the United Kingdom. A psychological autopsy of suicides in Finland revealed that 44% of the individuals had a previous suicide attempt (Isometsä & Lönnkvist, 1998). In Sri Lanka, 29% of individuals who died by suicide had a previous suicide attempt (Samaraweera, Sumathipala, Siribaddana, Sivayogan, & Bhugra, 2008), whereas two studies in the United States found that of individuals who died by suicide, 46% (Barraclough, Bunch, Nelson, & Sainsbury, 1974) and 42% of individuals had a history of suicide attempt (Conwell et al., 1998).

Interestingly, Barraclough and colleagues (1974) noted that a smaller percentage (8%) of those who died by suicide had made two or more previous suicide attempts. Additionally, Conwell and colleagues (1998) found a gender by age interaction in regard to previous attempt history. Specifically, the authors reported that of individuals who died by suicide, older women were more likely to have a history of suicide attempts than younger women, but older men were less likely to have a history of attempts than younger men.

Many psychological autopsy studies have used a case-control method to evaluate the individuals who have died by suicide compared to a living sample or a sample of individuals who have died by other causes. Many countries have used a case-controlled method with a living sample, all indicating that individuals who die by suicide are more likely to have a history of suicide attempt or deliberate self-harm as compared to a living

sample. The likelihood of this history of self-harm ranges between populations studied. In Scotland, those who died by suicide were four times more likely to have a history of self-harm (Cavanagh, Owens, & Johnstone, 1999); in Taiwan, almost six times more likely (Cheng, Chen, Chwen-Chen, & Jenkins, 2000); in New Zealand, nine and a half times more likely (Beautrais, 2001); in the United Kingdom amongst those who did not have access to mental health services, 39 times more likely (C. Owens, Booth, Briscoe, Lawrence, & Lloyd, 2003); in Hong Kong, 59 times more likely (Chen et al., 2006); and in Hong Kong amongst an elderly population, almost 37 times more likely to have a history of self-harm or suicide attempt compared to living controls (Chiu et al., 2004). One psychological autopsy report in China used a sample of individuals who died by injuries other than suicide as their control (Phillips et al., 2002). The authors found that those who died by suicide were almost 13 times more likely to have a history of suicide attempt compared to the control group.

Unfortunately, there is no evidence to suggest how those individuals who have died by suicide with a suicide attempt history (Trajectory 3, Figure 1) differ from those who have died without an attempt history (Trajectory 1, Figure 1). What is known however, is that in summarizing the studies cited, between 20 and 55% of individuals who die by suicide have a known previous history of self-harm or suicide attempt (e.g., Brown, et al., 2000; Cheng, et al., 2000).

Review of the Empirical Literature on Suicide Attempts and Suicide Attempt Recurrence

Although a history of suicide attempt is a major risk factor for eventual death by suicide, not all individuals with a history of suicide attempt will die by suicide. In fact,

approximately 10 to 15% of individuals with a suicide attempt history will die by suicide (Cullberg, Wasserman, & Stefansson, 1988). One must then consider the possibility that there are differences among individuals who attempt suicide – more specifically, differences among those with a single prior suicide attempt (Trajectory 2, Figure 1) compared to those with two or more prior suicide attempts (Trajectory 4, Figure 1). For example, a prospective study in England followed individuals with a suicide attempt over time (Hawton & Fagg, 1988). The individuals who died by suicide were more likely to have more than two previous suicide attempts compared to those who did not die by suicide.

Additionally, a study conducted within the a U.S. Veteran population found that those receiving services from the Department of Veterans Affairs with multiple suicide attempts were 46% more likely to die by suicide than Veterans with a single suicide attempt (Weiner, et al., 2011). These studies lend credibility to the idea that understanding differences between a single suicide attempt and multiple suicide attempts is important for suicide prevention efforts. The section below provides a summary of research findings on demographic, psychiatric, trauma history, and alcohol/drug use history factors that best differentiate between individuals with a single versus a multiple attempt history.

Demographics. Research indicates that men die by suicide at a higher rate than women (De Leo, Bertolote, & Lester, 2002) and that women are more likely to attempt suicide than men (Goldsmith, Pellmar, Kleinman, & Bunney, 2002), but the differences between individuals with a single suicide attempt compared to multiple suicide attempts in regards to sex is not as clear. In Brazil, males were more likely to present to the

hospital for their first suicide attempt whereas females were more likely to present for their second or more suicide attempt (Filinto da Silva Cais, Stefanello, Fabrício Mauro, Vaz Scavacini de Freitas, & Botega, 2009). In Hungary, females between the ages of 35 and 44 years were more likely to present for medical treatment with a history of multiple suicide attempts compared to a single attempt, whereas males with multiple suicide attempts were more likely to be between the ages of 20 and 35 years (Osváth, Kelemen, Erdős, Vörös, & Fekete, 2003). Additionally, there have been several studies comparing individuals with a single suicide attempt to individuals with multiple attempts where sex was not found to be a significant predictor (Forman, et al., 2004; Gupta, Trivedi, & Singh, 1992; Miranda et al., 2008; Rudd, Joiner, & Rahab, 1996), making the evidence on sex differences between single and multiple suicide attempters inconclusive.

Reports from the Centers for Disease Control and Prevention (CDC, 2011) refer to financial loss, social loss, and isolation from others as risk factors for suicide.

Economic status appears to play a role in differentiating individuals with a single suicide attempt versus individuals with multiple attempts in that those with multiple attempts potentially have less economic freedom. Osvath and colleagues (2003) found that women who were economically inactive and men who were unemployed were more likely to present to the hospital with a past history of suicide attempt. Economically inactive individuals and women describing themselves as housewives were also more likely to have more than one suicide attempt (Filinto da Silva Cais, et al., 2009).

Individuals with more than one suicide attempt compared to a single attempt were more likely to be homeless (Kaslow, et al., 2006) and unemployed males (Osváth, et al., 2003). Social loss and isolation from others may also be greater amongst individuals with more

than one suicide attempt given that living alone (Osváth, et al., 2003) or being divorced, widowed, or separated have all been linked to more than one attempt (Kaslow, et al., 2006; Osváth, et al., 2003).

Psychiatric factors. Given the possibility that having a history of more than one suicide attempt may put an individual at greater risk for death by suicide than a single attempt, it is logical to believe that more than one suicide attempt would also correlate with a higher severity of psychiatric factors than a single attempt. Hopelessness, an evidence-supported risk factor for death by suicide (CDC, 2011), has been shown to be higher amongst individuals presenting to a hospital with more than one suicide attempt as compared to those individuals presenting for their first suicide attempt (Filinto da Silva Cais, et al., 2009; Forman, et al., 2004; Kaslow, et al., 2006). Additionally, military members with multiple suicide attempts scored higher on a hopelessness scale than military members with only a single attempt or suicide ideation (Rudd, et al., 1996).

Other psychiatric risk factors of suicide also shown to be higher amongst individuals with more than one suicide attempt are depression (Filinto da Silva Cais, et al., 2009; Forman, et al., 2004; Reynolds & Eaton, 1986; Rudd, et al., 1996) and suicidal ideation (Filinto da Silva Cais, et al., 2009; Forman, et al., 2004). Such individuals may be postulated to have more difficulty coping with internal and external stressors resulting in increased levels of hopelessness, depression, and suicidal ideation and eventual suicide attempt(s). In fact, there is some evidence to suggest that individuals with multiple suicide attempts may have more difficulty effectively managing internal and external stressors. Reynolds and Eaton (1986) found individuals with three or more suicide attempts presenting to the emergency department to have a poor coping history, assessed

through clinical interview, compared to the individuals presenting with only a single suicide attempt. Internally, individuals with two or more suicide attempts demonstrate more psychological distress (Kaslow, et al., 2006), higher levels of negative self-evaluation, and experience more hostility (Rudd, et al., 1996) and anger (Filinto da Silva Cais, et al., 2009). Externally, individuals with multiple attempts show more difficulties in social role performance (Filinto da Silva Cais, et al., 2009), poorer problem solving (Forman, et al., 2004), and demonstrate more disruptive behavior after multiple attempts (Miranda, et al., 2008).

A history of psychiatric disorders is another factor that puts an individual at greater risk for suicide (CDC, 2011) and therefore at risk for suicide-related behaviors. In regards to general severity of psychopathology, there is evidence to suggest that individuals with more than one suicide attempt are at greater risk. Individuals with multiple attempts have been found to have a higher number of overall symptoms (Kaslow, et al., 2006) and longer duration of symptoms (Reynolds & Eaton, 1986), lower global assessment of functioning scores (Forman, et al., 2004), more diagnoses (Forman, et al., 2004; Miranda, et al., 2008; Rudd, et al., 1996), higher levels of psychiatric comorbidity (Osváth, et al., 2003), younger age of onset of diagnoses (Rudd, et al., 1996), and long-term usage of psychiatric services (Stephens, 1987).

Additionally, a number of specific psychiatric issues have been observed among individuals with multiple suicide attempts. Personality disorders in general (Osváth, et al., 2003), higher frequency of personality disorders (Gupta, et al., 1992), and borderline personality disorder (Forman, et al., 2004; Rudd, et al., 1996) have all been correlated with multiple suicide attempts compared with a single attempt. Several clinical disorders

have also been associated with more than one suicide attempt compared to a single attempt. Psychosis (Forman, et al., 2004) and psychotic disorders, mood disorders (Osváth, et al., 2003), including dysthymia (Rudd, et al., 1996), anxiety disorders (Miranda, et al., 2008), social and specific phobia, and panic disorder (Rudd, et al., 1996) have all been correlated with more than one suicide attempt.

Moreover, genetic vulnerability may also impact an individual's frequency of attempting suicide. Specifically, the CDC has identified a family history of suicide as a risk factor for eventual death by suicide and several studies have found that a family history of suicide and/or suicide attempt are more prevalent among individuals with more than one suicide attempt (Forman, et al., 2004; Jeglic, Sharp, Chapman, Brown, & Beck, 2005; Reynolds & Eaton, 1986). Family psychopathology may also play a role in an individual having multiple suicide attempts versus a single attempt. Forman and colleagues (2004) found that individuals with multiple suicide attempts were more likely to have a family history of mental illness and Stephens (1986) found a higher incidence of family diagnoses and higher frequency of mothers with diagnoses to correlate with more than one suicide attempt in women.

Trauma history. Individuals with Posttraumatic Stress Disorder may display self-destructive and impulsive behaviors including attempting suicide (Foa, Keane, & Friedman, 2000), but there is also evidence to suggest that a history of trauma is more common among individuals with multiple suicide attempts. Filinto Da Silva Cas and colleagues (2009) found that individuals with a history of multiple suicide attempts were more likely to have reported emotional, physical, and sexual abuse than those with only a single attempt, but the authors did not specify the time period of the abuse. Other studies

indicate that it may only be childhood abuse or trauma which correlates to multiple attempts.

Forman and colleagues (2004) found that individuals with multiple suicide attempts were more likely to have been emotionally abused in childhood, even after controlling for a diagnosis of borderline personality disorder. Additionally, women with a multiple suicide attempt history were more likely to report physical and sexual abuse in childhood (Stephens, 1987). In regard to trauma in general, women with multiple suicide attempts were less likely to have two parents in the home during childhood and more likely to have lost both parents than women with a single attempt (Stephens, 1987). Kaslow and colleagues (2006) also found that a higher number of traumatic events in childhood, but not in adulthood, correlated with multiple suicide attempts in women. Additionally, the number of traumatic events in the year prior to the index suicide attempt did not significantly correlate with a history of multiple suicide attempts (Kaslow, et al., 2006). However, Pompili and colleagues (2011) found that repeat suicide attempt status was most predicted by having significant life events in childhood, significant life events 6 months prior to the index suicide attempt, and the interaction between the two.

History of alcohol and drug abuse. The CDC (2011) has identified a history of alcohol and drug abuse as risk factors for suicide. Evidence suggests that alcohol and drug abuse are also more commonly correlated to individuals with multiple suicide attempts than individuals with a single suicide attempt. As determined by clinical interview or validated substance abuse screening measure, individuals with multiple suicide attempts are more likely to abuse alcohol (Kaslow, et al., 2006; Osváth, et al., 2003; Reynolds & Eaton, 1986; Stephens, 1987) or abuse drugs (Kaslow, et al., 2006;

Reynolds & Eaton, 1986; Stephens, 1987). Additionally, based on self-report questionnaires, individuals with multiple attempts are more likely to abuse alcohol (Rudd, et al., 1996), to report a history of substance abuse diagnosis (Forman, et al., 2004), or to have participated in substance-related treatment (Kaslow, et al., 2006).

Conclusions

Individuals with multiple suicide attempts may present with a more severe clinical picture than those with a single suicide attempt. Included in the picture are difficulties managing internal and external stressors, comorbidity of psychiatric diagnoses, specific Axis I and Axis II diagnoses including alcohol and drug abuse, and a history of childhood trauma. Despite the evidence indicating this more severe clinical picture among multiple suicide attempters and the risk of dying by suicide if there is a history of suicide attempt, most psychological autopsy studies indicate that the majority of individuals who die by suicide do not have a history of suicide attempt (e.g., Conwell, et al., 1998; Samaraweera, et al., 2008).

Unfortunately, the studies reviewed thus far are unable to determine whether or not (1) those with a history of suicide attempt that do not die by suicide (Trajectory 2 and 4, Figure 1); (2) those with a history of suicide attempt that eventually die by suicide (Trajectory 3, Figure 1); and (3) those without a history of suicide attempt that die by suicide (Trajectory 1, Figure 1) have the same characteristics.

There has been one important study that can shed some light on this question. Beautrais (2001) conducted a study using a psychological autopsy style and case-control methodology to determine if individuals with a serious suicide attempt and those who die by suicide are the same population. Beautrais also compared both groups to a living

sample control, additionally using interviews from family members in order to maintain similar methodology between groups. The author found many similarities between serious suicide attempt predictor variables and suicide death predictor variables to include current mood disorder, previous suicide attempts, prior outpatient psychiatric treatment, admission to an inpatient psychiatric unit within one year, low income, less formal education, and more recent life stressors. Beautrais reported that these two groups differed in that those who died by suicide were more likely to be male, older, and have a current diagnosis of psychosis (i.e., at the time of death), whereas those with a suicide attempt were more likely to have a current diagnosis of anxiety disorder (i.e., at the time of the attempt) and to be socially isolated.

Purpose and Significance

As previously indicated, a history of suicide attempt puts an individual at greater risk for eventual death by suicide, but less than 15% of individuals with a suicide attempt will go on to die by suicide. It is therefore important to determine the characteristics of those individuals who attempt suicide and may fall within this mentioned 15% that will die by suicide. Individuals with multiple suicide attempts may make up a great portion of this group (Hawton & Fagg, 1988). Presently, the DoD does not have any clinical practice guidelines for treating individuals with current and/or lifetime suicide-related behaviors. These guidelines are currently being developed (M. Holloway, personal communication, January 10, 2012). Regardless of the nature of these guidelines, research and clinical attention must consider addressing the unique assessment and treatment needs of those with or without a suicide attempt history. To consider these two groups as having homogeneous needs may be detrimental to our national suicide prevention efforts.

To our knowledge, Beautrais (2001) is the only investigator who has directly attempted to address the important question regarding suicide attempts and suicide deaths; how are they the same and how are they different? The study did not, however, examine whether those with a single suicide attempt (Trajectory 2, Figure 1) are different from those with multiple attempts (Trajectory 4, Figure 1) or whether those who die on their first suicide attempt (Trajectory 1, Figure 1) are different from those with a prior history of suicide attempt (Trajectory 3, Figure 1). Additionally, the study involved only a civilian population which may not generalize to a military population. Therefore, the overall purpose of the present study is to gain insight about single versus multiple attempts as observed in two independent samples: (1) active duty military personnel psychiatrically hospitalized for a suicide attempt; and (2) active duty Air Force military personnel deceased due to suicide.

The second sample is used to determine if active duty military members hospitalized with multiple suicide attempts present with a more severe clinical picture than those with a single attempt. This distinction is important for treatment implications in that it may be necessary for individuals with more than one suicide attempt to be given a different type of assessment and treatment than those with a single attempt.

Additionally, the majority of individuals who die by suicide do not have a documented history of suicide attempt so it is vital to learn if these individuals are similar or different than those with a known robust risk factor for eventual death by suicide, i.e., suicide attempt history. The first sample is used to compare those who have died by suicide with a history of suicide attempt and without amongst a population of active duty military members. Determining the factors that are similar and/or different between these

two groups will begin to fill the massive gap in the military research on this topic.

Further, identifying factors that correlate with suicide, but differ based on suicide attempt history will be instrumental to suicide prevention efforts in the military.

Aims and Hypotheses

Aim 1: To characterize the demographic, psychosocial, and psychiatric characteristics within each specified sample (i.e., Suicide Death and Suicide Attempt groups).

Aim 2: To determine the demographic, psychosocial, and psychiatric differences among individuals with and without a suicide attempt history within each specified sample (i.e., Suicide Death and Suicide Attempt groups).

Hypothesis 2a: Among the demographic factors, female sex, lower rank, and being divorced/separated/widowed are hypothesized to be significantly more prevalent in the multiple suicide attempt group.

Hypothesis 2b: Among the psychosocial factors, interpersonal stressors, legal stressors, and work stressors prior to the index suicide attempt and a history of childhood sexual abuse are hypothesized to be significantly more prevalent in the multiple suicide attempt group.

Hypothesis 2c: Among the psychiatric factors, a psychiatric diagnosis of mood disorder, anxiety disorder, substance use disorder, any personality disorder and indication of problem substance use are hypothesized to be significantly more prevalent in the multiple suicide attempt group.

Aim 3: To identify the best model for explaining the associations among demographic, psychosocial, and psychiatric factors and suicide attempt history within each specified sample (i.e., Suicide Death and Suicide Attempt groups).

Hypothesis 3a: Among the demographic, psychosocial, and psychiatric factors used in the bivariate analyses, all significant variables are hypothesized to predict multiple suicide attempt status in logistic regression analyses.

There is minimal research on suicide attempts within the active duty military population and to our knowledge, there has never been a study examining differences between suicide attempt histories in a sample of individuals who have died by suicide. It is for this reason that the present study has employed two different samples to investigate variables that may be the same and may be different among (1) those with a history of one suicide attempt; (2) those with a history of multiple suicide attempts; (3) those who die by suicide without a history of suicide attempt; and (4) those who die by suicide with a history of suicide attempt.

Sample 1 – Cases of Suicide

Methods

Case selection. Suicide cases were drawn from death investigation files made available by the United States Air Force Office of Special Investigations (AFOSI). A total of 236 suicide cases were included for consideration in the study. Out of the 236 suicide cases, history of suicide attempt was unable to be determined in 19 cases, making a total of 217 cases of suicide for analyses. These cases were drawn from two major data collections phases: (1) Phase I which consisted of a random selection of death investigatory records of USAF personnel who died by suicide between the years of 1996 and 1999 (Nademin et al., 2008); and (2) Phase II which consisted of a consecutive selection of death investigatory records of USAF personnel who died by suicide between the years of 2000 and 2006 with the exception of three which were unavailable and with

the addition of two cases from later years. Phase I was conducted as a research effort by Nademin and colleagues at the Catholic University of America and Phase II was conducted as a research effort by Holloway and colleagues at the Uniformed Services University of the Health Sciences (USUHS). Data collection for both phases involved the same data extraction tool and similar procedures.

The AFOSI conducts a comprehensive investigation of the circumstances surrounding the suicide death of each Air Force member. The death investigation files consist of the following: (1) AFOSI interviews with the decedents' family members, significant others, peers, and coworkers; (2) applicable records such as medical and mental health records, personnel files, and financial statements; (3) toxicology and medical autopsy reports; (4) relevant evidence of communications prior to death, including email and telephone communications; and (5) evidence collected from the death scene, such as suicide notes.

Measure. This study employed the use of the Suicide Death Investigation Template (SDIT). The SDIT was created by a group of experts in suicidology and subsequently modified by Holloway and colleagues. The SDIT is a Microsoft Access electronic coding form with 453 variables consisting of primarily dichotomous (yes/no) variables, as well as some categorical, continuous, and open-ended variables. The SDIT contains six groupings: (1) demographic information; (2) military-specific information; (3) suicide event information; (4) risk factors for suicide-related behaviors; (5) protective factors for suicide-related behaviors; and (6) helping services utilization.

Procedure. The study was conducted as a collaborative research effort between the AFOSI, the Air Force Suicide Prevention Program, and USUHS. Institutional

Review Board (IRB) approvals were obtained from the Malcolm Grow Medical Center and USUHS regulatory boards. All coding personnel had a minimum of a bachelor's degree and were individually trained on the SDIT, extraction of variables from the suicide death investigation files, and on issues pertaining to confidentiality. The coding personnel utilized the SDIT coding manual which defined each variable within the coding system. Coding sessions involved a group of two or more coding personnel who traveled to AFOSI approved locations for records review. A group format for the codings provided an opportunity for discussion on questions regarding data input and group consensus as needed. Each coding member was given a copy of the Microsoft Access SDIT, a coding manual, and a single suicide death investigation case. Coders first conducted a general review of the case and then inputted the data into the SDIT during a second review. Due to the sensitive nature of gaining access to the suicide death investigation cases and time limitations, it was not feasible to gain access to cases more than once for the purpose of conducting an inter-rater reliability check. During Phase I of the data collection, conducted by Nademin and colleagues (2008), a random sampling procedure was used to select 10% of coded cases for an inter-reliability check. Reliability was moderate to high across coded variables with kappa coefficients ranging from 0.57 to 1.0.

Of particular relevance to this study is the collection of the suicide attempt history, demographic, psychosocial, and psychiatric variables. Demographic variables collected for this study included age, gender, race/ethnicity, and marital status. Additionally, military paygrade or rank was collected as an indicator of income. Psychosocial variables include (1) interpersonal stressors occurring within 3 months of

the suicide death, such as the end of a romantic relationship or physical fight with family member; (2) legal stressors occurring within 3 months of the suicide death, such as military legal difficulties and pending court date; (3) work stressors occurring within 3 months of the suicide death, such as being passed over for promotion or loss of work satisfaction; and (4) history of childhood sexual abuse. Psychiatric variables include (1) substance-related issues, such as substance diagnoses and substance issues known by others; (2) DSM-IV Axis I diagnoses, as documented in a behavioral health record; and (3) DSM-IV Axis II diagnoses, as documented in a behavioral health record.

Data analytic strategy. Suicide attempt history was divided into two groups consisting of “No Attempt History” and “Suicide Attempt History”. All psychosocial and psychiatric variables were dichotomous yes/no variables. Rarely, if ever, was there explicit evidence in the record that a psychosocial or psychiatric variable did not exist in the individual’s life. For this reason all variables coded as “unknown” were recoded as “no”. This method of coding restricts our interpretation to mean either, “yes”, the coder found evidence in the record pertaining to the existence of this variable or “no”, the coder did not find any evidence in record pertaining to the specific variable.

Bivariate analyses using Chi-square (X^2) tests and Fisher’s exact tests (two-tailed) were conducted to determine if relationships exist between suicide attempt status and demographic, psychosocial, and psychiatric factors. Step 1 in the data analytic plan consisted of a total of 24 independent comparisons, increasing the possibility of making a Type I error. Given the error rate of $\alpha = .05$ for a total of 24 comparisons, it is estimated that of all significant findings, one finding could be the result of a Type I error, or false-positive. For this reason additional analyses in Step 2 of the data analytic plan were

conducted to account for possible Type I error. A binary logistic regression was then conducted using variables significant in the bivariate analyses, as well as variables suggested by the suicide attempt literature and clinical relevance, i.e. sex and variables highly prevalent in the sample. The logistic regression was used to determine the best model for explaining the associations between suicide attempt status and the demographic, psychosocial, and psychiatric factors. Analyses were performed using SPSS 18.0 for Windows and SAS 9.3.

Due to the retrospective methodology of this study and the preset sample size, a post hoc power analysis was conducted for the bivariate analyses. A small effect size of $\phi = .17$ and a sample size of $n = 217$ resulted in a total power of 71%, making this study marginally underpowered to detect small effect sizes. Power analysis conducted with G*Power3.1.3.

Results

Descriptive statistics. Of the 217 suicide death cases analyzed, 23% ($n = 50$) had a documented suicide attempt history and 77% ($n = 167$) had no documented history of a suicide attempt. Table 1 presents a summary of demographic characteristics of the sample. The mean age of the sample was 30.00 years ($SD = 8.86$) and a large portion of the sample was male (93.5%), Caucasian (77.4%), married (48.4%), and held a rank between E-4 and E-6 (55.3%). The majority of the sample had a documented interpersonal stressor within three months prior to death (82.9%), almost half had a work stressor (41.5%) and just over a third had a legal stressor within three months prior to death (34.1%). Almost half of the sample had some documentation of an alcohol related event prior to death (44.2%) and almost a quarter had reports of a drug related event

(23.0%). The most common psychiatric diagnoses reported were substance use disorders (9.7%) and mood disorders (9.2%) with any Axis I disorder diagnosis represented by a quarter of the sample (26.3%). Additional details regarding psychosocial and psychiatric characteristics of the sample can be found in Table 2.

Bivariate analyses. Chi-square analyses were conducted to determine if relationships exist between suicide attempt history (No Attempt History or Suicide Attempt History) and a number of demographic, psychosocial, and psychiatric variables. Findings indicated that USAF suicide decedents with a documented suicide attempt history compared with those without such history were more likely to demonstrate (1) a documented interpersonal stressor occurring within 3 months of their death ($\chi^2 = 4.07$, $p = .004$); (2) at least one documented Axis I diagnosis (Fisher's Exact Test, $p = .017$); and (3) a documented diagnosis of dependent personality disorder (Fisher's Exact Test, $p = .012$). Additional details regarding bivariate analyses can be found in Table 3.

Test of binary model. Interpersonal stressors within 3 months and any Axis I diagnosis were both entered in the logistic regression given the significance found in the bivariate analyses. Dependent personality disorder was excluded from the model due to the exceptionally small sample ($n = 3$). Additionally, gender was added to the model to ensure that any differences occurring due to gender would be controlled for when determining the odds ratios for the remaining variables. The overall model with independent variables of gender, interpersonal stressor within 3 months, and any Axis I disorder and a dependent variable of suicide attempt history status was significant ($\chi^2 = 9.99$, $p = .019$). USAF suicide decedents with a suicide attempt history were over twice as likely to have a diagnosis of any Axis I disorder than those with no history of attempt

(OR = 2.23, $p = .021$). Gender and interpersonal stressors within 3 months of death were not significant predictors of suicide attempt history status. Table 4 presents a summary of logistic regression analysis predicting suicide attempt history.

Sample 2 – Cases of Suicide Attempts

Methods

Case selection. Suicide attempt cases were drawn from electronic medical records (EMR) obtained from a large U.S. Army hospital, Walter Reed Army Medical Center (WRAMC). A total of 463 suicide attempt cases were included for consideration in the study. Out of the 463 suicide cases, suicide attempt status was unable to be determined in 40 cases, making a total of 423 cases of suicide attempt for analyses. These cases were selected from cases of individuals admitted to the inpatient psychiatric unit for suicide ideation, suicide attempt, or an adjustment reaction. All patient records with an admittance reason of suicide attempt between the years of 2001 and 2006 were included in the analyses.

The EMRs are part of a clinical documentation database that houses details of the patients and the care received within military medical facilities. The EMRs contain medical documentation provided by psychiatrists, psychologists, social workers, psychiatric nurses, and other clinical staff.

Measure. This study employed the use of a Microsoft Access electronic medical record coding form developed by Holloway and colleagues and reviewed by an expert suicidologist and other research collaborators. The coding form included 51 variables consisting primarily of categorical variables, as well as some dichotomous (yes/no), continuous, and open-ended variables. The form was used to assess five domains: (1)

demographic information; (2) military-specific information; (3) suicide behavior information; (4) psychiatric history information; and (5) psychiatric treatment received and diagnoses.

Procedure. The study was conducted as a collaborative research effort between WRAMC Department of Psychiatry and USUHS. IRB approvals were obtained from the WRAMC and USUHS regulatory boards. All coding personnel had a minimum of a bachelor's degree and were individually trained on the coding form, extraction of variables from the EMRs, and on issues pertaining to confidentiality. Each coding member was given a password-protected copy of the Microsoft Access medical record coding form and a list of ten randomly selected cases to review for inclusion and possible coding. Coders first conducted a general review of the case and then inputted the data into the Microsoft Access medical record coding form during a second review, if the case met inclusion for the study. Items reviewed within the EMR included the attending admit note, case manager note, psychiatric social work assessment, psychiatric and physical history form, pastoral services assessment, and nursing admission note. A random sampling procedure was used in the larger sample to select coded cases for an inter-rater reliability check. For the current sample, the random sampling procedure resulted in approximately 3% of coded cases for the inter-rater reliability check. Reliability for the suicide attempt status variable was high with a kappa coefficient of 0.84.

Of particular relevance to this study is the collection of the suicide attempt status, demographic, psychosocial, and psychiatric variables. Demographic variables collected for this study included age, gender, race/ethnicity, and marital status. Additionally,

military paygrade or rank was collected as an indicator of income. Psychosocial variables include (1) interpersonal trigger for index suicide attempt; (2) legal trigger for index suicide attempt; (3) work trigger for index suicide attempt; and (4) history of childhood sexual abuse. Psychiatric variables include (1) substance-related issues, such as substance diagnoses and problem substance use; (2) DSM-IV Axis I diagnoses, as documented in the EMR; and (3) DSM-IV Axis II diagnoses, as documented in the EMR.

Data analytic strategy. Suicide attempt status was divided into two groups consisting of “Single Suicide Attempt” and “Multiple Suicide Attempt”. All psychosocial and psychiatric variables were dichotomous yes/no variables. Rarely, if ever, was there explicit evidence in the record that a psychosocial or psychiatric variable did not exist in the individual’s life. For this reason all variables coded as “unknown” were recoded as “no”. This method of coding restricts our interpretation to mean either, “yes”, the coder found evidence in the record pertaining to the existence of this variable or “no”, the coder did not find any evidence in record pertaining to the specific variable.

Bivariate analyses using Chi-square (χ^2) tests and Fisher’s exact tests (two-tailed) were conducted to determine if relationships exist between suicide attempt status and demographic, psychosocial, and psychiatric factors. Step 1 in the data analytic plan consisted of a total of 24 independent comparisons, increasing the possibility of making a Type I error. Given the error rate of $\alpha = .05$ for a total of 24 comparisons, it is estimated that of all significant findings, one finding could be the result of a Type I error, or false-positive. For this reason additional analyses in Step 2 of the data analytic plan were conducted to account for possible Type I error. A binary logistic regression was then conducted using variables significant in the bivariate analyses, as well as variables

suggested by the suicide attempt literature and clinical relevance, i.e. sex and variables highly prevalent in the sample. The logistic regression was used to determine the best model for explaining the associations between suicide attempt status and the demographic, psychosocial, and psychiatric factors. Analyses were performed using SPSS 19.0 for Windows and SAS 9.3.

Due to the retrospective methodology of this study and the preset sample size, a post hoc power analysis was conducted for the bivariate analyses. A small effect size of $\phi = .16$ and a sample size of $n = 423$ resulted in a total power of 91%, making this study sufficiently powered to detect small effect sizes. Power analysis conducted with G*Power3.1.3.

Results

Descriptive statistics. Of the 423 suicide attempt cases analyzed, 39.5% ($n = 167$) had a multiple suicide attempt status and 60.5% ($n = 256$) had a single suicide attempt status. The mean age of the sample was 25.61 years ($SD = 7.23$) and a large portion of the sample was male (62.2%), Caucasian (64.3%), never married (49.6%), and held a rank between E-1 and E-3 (48.0%). Table 5 presents a summary of demographic characteristics of the sample. Well over half of the sample had evidence indicating a trigger for the index suicide attempt was interpersonal in nature (68.1%) and/or work related (63.6%). Almost the entire sample had documentation of at least one Axis I disorder (95.3%), with mood disorder (53.2%) and adjustment disorder (53.3%) occurring most frequently. A diagnosis of a substance use disorder (30.5%) and indication of problematic substance use (33.85) occurred in approximately one third of the sample. A large portion of the sample had either a personality disorder diagnosis or

listing of personality disorder traits (64.1%). Additional details regarding psychosocial and psychiatric characteristics of the sample can be found in Table 6.

Bivariate analyses. Chi-square analyses were conducted to determine if relationships exist between suicide attempt status (Single Suicide Attempt or Multiple Suicide Attempt) and a number of demographic, psychosocial, and psychiatric variables. Results indicated that none of the demographic variables were related to suicide attempt status. In terms of psychosocial and psychiatric variables, psychiatrically hospitalized military patients with multiple prior suicide attempts compared with those with a single prior attempt were more likely to demonstrate (1) a documented history of childhood sexual abuse ($\chi^2 = 5.00$, $p = .025$); (2) a documented problem substance use ($\chi^2 = 10.68$, $p = .001$); (3) either an admission or discharge diagnosis of mood disorder ($\chi^2 = 7.98$, $p = .005$); (4) either an admission or discharge diagnosis of substance disorder ($\chi^2 = 3.84$, $p = .050$); (5) either an admission or discharge diagnosis of personality disorder not otherwise specified ($\chi^2 = 5.58$, $p = .018$); and (6) any documented Axis II trait or disorder ($\chi^2 = 4.31$, $p = .038$). Additional details regarding bivariate analyses can be found in Table 7.

Test of binary model. All six variables significant in the bivariate analyses were added to the logistic regression model. Additionally, adjustment disorder was included in the model because it was trending toward significance in the chi-square analysis ($\chi^2 = 3.10$, $p = .078$) and because over half of the sample (53.2%) had a diagnosis of adjustment disorder. Given this high prevalence, it was clinically relevant to include adjustment disorder in the model. Although gender and suicide attempt status did not have a significant relationship, gender was related to childhood sexual abuse ($\chi^2 = 34.19$, $p < .001$), problem substance use ($\chi^2 = 7.70$, $p = .006$), a substance disorder diagnosis (χ^2

= 7.76, $p = .005$), and an adjustment disorder diagnosis ($\chi^2 = 3.95$, $p = .047$). For this reason and due to well-established literature on gender differences in suicide attempt prevalence, separate regression models were run for males and females.

Males. The overall model for males consisted of the independent variables of childhood sexual abuse, problem substance use, substance disorder diagnosis, mood disorder diagnosis, adjustment disorder diagnosis, a diagnosis of personality disorder not otherwise specified, and any Axis II trait or disorder with a dependent variable of suicide attempt status. The model for males was significant ($\chi^2 = 31.91$, $p < .001$).

Psychiatrically hospitalized military male patients with multiple prior suicide attempts compared with those with a single prior attempt were almost two and a half times more likely to have problem substance use ($OR = 2.43$, $p = .005$) and almost three times more likely to have a mood disorder diagnosis ($OR = 2.88$, $p = .002$). The remaining variables in the model were not significant predictors of suicide attempt status in males. Table 8 presents a summary of logistic regression analysis for males predicting suicide attempt status.

Females. A similar regression model was run for females. However, the overall model was not significant ($\chi^2 = 10.46$, $p = .164$). The only significant variable in the model was childhood sexual abuse; therefore the logistic regression analysis was rerun with childhood sexual abuse as the only independent variable. Childhood sexual abuse was a significant predictor in that psychiatrically hospitalized military female patients with multiple prior suicide attempts compared with those with a single prior attempt were over twice as likely to have a history of childhood sexual abuse than those with a single

attempt status ($OR = 2.12, p = .027$). Table 9 presents a summary of logistic regression analysis predicting suicide attempt status in females.

Discussion

This study employed a two-sample method to investigate factors that may differentiate military personnel with or without a documented history of attempted suicide. In the sections below, specific findings based on Sample 1 (cases of suicide) will first be discussed, followed by specific findings on Sample 2 (cases of suicide attempts), and concluding with a critical discussion of how these two studies contribute to the broader suicidology literature and to our understanding of the unique assessment and treatment needs of individuals with single versus multiple suicide attempt histories.

Sample 1 – Cases of Suicide

Among the cases of Air Force suicides, 23% ($n = 50$) had some documentation of a prior suicide attempt. Results found few differences between those with versus without a documented history of suicide attempt. Specifically, decedents with a history of attempted suicide were significantly more likely to have documentation of an interpersonal stressor within three months prior to death, lifetime diagnosis of an Axis I disorder, and a diagnosis of Dependent Personality Disorder. There are no other studies making a single versus multiple suicide attempt comparison among a decedent population to refer to, but there are studies among a living sample. Interpersonal stressors prior to a suicide attempt (Pompili, et al., 2011) and Axis I disorder diagnoses have both been correlated to multiple suicide attempts (e.g., Forman, et al., 2004; Osváth, et al., 2003). Although no study to our knowledge has found dependent personality disorder specifically to be related to a multiple suicide attempt status, multiple attempts have been

related to personality disorders in general among living samples, indicating this finding is not surprising (Osváth, et al., 2003).

Upon further analysis, interpersonal stressors did not remain a significant predictor of suicide attempt status when accounting for any Axis I disorder diagnosis. Additionally, a diagnosis of Dependent Personality Disorder occurred too infrequently to include in subsequent analyses. Therefore, the most discriminating differentiating factor for suicide decedents with or without a suicide attempt history was determined to be any Axis I disorder diagnosis.

In terms of the null findings of the study associated with the demographic as well as the remaining psychosocial and psychiatric variables, one possible explanation may be simply the fact that all of the individuals in this sample eventually died by suicide, possibly making them a homogenous group. To date, no previous study has examined the association between suicide attempt status and demographic, psychosocial, and/or psychiatric variables within a suicide decedent sample. While this explanation may be plausible, it is difficult to imagine that individuals who die by suicide do not fall into typologies based on their prior psychiatric history including attempted suicide.

Another prospect is that differences were not detected given the sample was marginally underpowered. Other possible explanations for the observed non-significant findings within the selected sample may be related to military service and/or the manner of documentation practices used at the USAF Office of Special Investigations Office in the conduct of the death investigations. For instance, findings in this study suggest that military Service Members may have less documented psychopathology compared with their civilian counterparts, as indicated by other suicide psychological autopsy studies

where psychopathology was more prevalent (e.g., Samaraweera et al., 2008; Barraclough et al., 1974). Data on psychiatric conditions experienced by the decedents, in this study, was based exclusively on requested and received military medical records. Therefore, the accuracy of psychiatric historical data for this sample remains questionable due to possible underreporting on the part of the military patient and/or the military provider. A documented history of psychopathology seems particularly important within our sample as the one major distinguishing variable between a person who dies by suicide with a previous suicide attempt and one who dies on their first attempt is documentation of any Axis I disorder.

Sample 2 – Cases of Suicide Attempts

Among the cases of suicide attempts, 39.5% ($n = 167$) had documentation of a multiple suicide attempt history. A number of differentiating factors emerged after examining the characteristics of those with single versus multiple suicide attempt histories. In particular, all psychiatric variables hypothesized to be predictive of a multiple attempt status were confirmed with the exception of a diagnosis of anxiety disorder. Individuals with a documented lifetime diagnosis of a mood disorder, substance use disorder, personality traits, or a personality disorder were significantly more likely to have multiple suicide attempts. All of these findings are supported by previous literature indicating multiple attempt status equates to a more severe clinical picture (Forman, et al., 2004; Kaslow, et al., 2006; Miranda, et al., 2008; Osváth, et al., 2003; Reynolds & Eaton, 1986; Rudd, et al., 1996).

These findings are consistent with prior research for single versus multiple attempt status, including the only other study conducted within a military population

(Rudd et al., 1996). The insignificant finding in regard to anxiety disorders may be related to the low frequency of documented phobias in our sample. Rudd and colleagues (1996) found that individuals with multiple attempted suicides were more likely to receive a simple or social phobia diagnosis as compared with those with single attempts. However, such diagnoses were determined through a semi-structured clinical interview and were based on a mixed outpatient, inpatient, and emergency department sample. The sample used within the current study may have exhibited a lower frequency of documented anxiety disorders of this nature because of the inpatient nature of diagnostic decisions made by admitting providers. Another potential plausible explanation for the null findings associated with anxiety disorders is that the most common type of anxiety disorder diagnosed at inpatient military settings (including WRAMC, the site where our data collection took place) is posttraumatic stress disorder (PTSD). Therefore, it is possible that military inpatients with or without a history of suicide attempt may be similar in terms of the rate at which they receive a PTSD diagnosis.

Moreover, upon further analyses, substance use and personality disorders (as well as traits) did not remain as significant predictors of attempt status when accounting for a mood disorder diagnosis and problem substance use amongst males. It is likely that most individuals with a diagnosis of a substance use disorder also had indications in their medical record of problematic substance use, but not all problematic substance users were given a formal diagnosis. In regard to a diagnosis of a mood disorder accounting for the predictability of personality traits and disorders in multiple suicide attempters, the presence of a mood disorder may exacerbate an individual's personality traits, resulting in a diagnosis.

Several other single versus multiple suicide attempt studies have found personality disorders to be a significant predictor of multiple attempt status; however these studies all employed some version of a researcher determined diagnosis (Forman et al., 2004; Osvath et al., 2003) or a single personality assessment (Rudd et al., 1996). The diagnoses in this study were charted by inpatient providers at a military treatment facility, based on a clinical interview, and then extracted from electronic medical records. Issues such as mental health stigma and/or perceived impact of mental health diagnoses on military career progression may be associated with reluctance on the part of the patient to disclose accurate information and/or the provider to document a more severe diagnosis – both scenarios making the threshold for giving a personality disorder diagnosis higher.

Furthermore, there were no demographic predictors of suicide attempt status within this sample. This finding is not surprising giving the inconsistencies and null findings in the literature on demographic factors. Sex (Forman, et al., 2004; Gupta, et al., 1992; Miranda, et al., 2008; Rudd, et al., 1996), race/ethnicity (Forman, et al., 2004; Rudd, et al., 1996), and age (Filinto da Silva Cais, et al., 2009; Forman, et al., 2004; Gupta, et al., 1992; Rudd, et al., 1996) have all been non-significant findings in previous work on single versus multiple suicide attempts. Of the psychosocial predictors, childhood sexual abuse was found to be a significant predictor of suicide attempt status. In females, childhood sexual abuse was the single significant predictor of multiple attempt status. Females with a history of childhood sexual abuse were twice more likely to have a history of multiple versus single suicide attempts. This finding is in accord with two studies (i.e., Kaslow, et al., 2006; Stephens, 1986) that have found childhood abuse to be predictive of a multiple attempt status primarily in females. Similar to what

has been explained earlier, childhood sexual abuse may not be commonly assessed and/or self-reported in military male inpatients.

Although interpersonal, work-related, and legal stressors were hypothesized to be related to multiple attempt status, the insignificant findings in our study may be related to the nature of the variables collected. Our study used primary and secondary triggers for the index suicide attempt, while Pompili and colleagues (2011) used a stressful life events assessment measure, capturing all stressful life events occurring within 6 months prior to the index suicide attempt.

Comparison of the Two Studies

Overall, because the methodology used in each study was considerably different, a direct analytical comparison could not be made. This limitation prevents us from being able to make confident predictions about whether those who attempt suicide and those who die by suicide are differing populations. In both of our samples (i.e., living and deceased), single versus multiple suicide attempt status equated to some differing characteristics with the living sample showing more differences than the deceased sample. The findings from the living sample resembled those reported in the suicidology literature, with the exception that the severity of the clinical picture is less notable within this military sample compared with a civilian sample due to issues discussed earlier. Clinical indicators did not greatly contribute to differentiation of suicide decedents based on suicide attempt status, which could be due to the following explanations: (1) those who die versus those who survive an attempt may be different populations; and/ or (2) a death investigation methodology is not sufficient for detecting differences between past suicide attempt history.

Limitations

Despite the unique nature of this two-sample study design, there are some limitations to consider. First, both samples employ a retrospective methodology with third-party involvement which highlights the potential for recall bias and documentation accuracy. Sample 1 data which was extracted from suicide death investigatory cases of the Air Force employed a psychological autopsy style of data collection. However, the original collection of information on each case was conducted by a single Air Force OSI official for the purposes of manner of death determinations and not research. Therefore, a systematic effort was not sustained on maintaining uniformity in the type and extent of data collected within each case – i.e., the AFOSI investigator made decisions about the type of information to collect. The death investigation files were then reviewed by our study coders and information on over 400 variables were extracted for scientific purposes. Sample 2 data which was extracted from the electronic medical records at a military treatment facility, used a retrospective chart review study design. The original collection of information was conducted by admitting provider(s) and other medical staff who most likely used clinical interview data for arriving at the notes placed in charts. In both samples, our data is limited by the information the OSI investigators or medical team deemed important, what questions were asked and of whom, the materials disclosed to these individuals, and subsequently, the information documented in either the death investigation and/or medical records. Due to this method of data collection, it is possible that information relevant to this study was not gathered. Take together, any variables coded as “no” or any null findings cannot be interpreted as a non-existence of such variables or differences, but as a non-existence of documentation.

Many of the studies investigating single versus multiple suicide attempt status have employed measures of symptomatology to determine whether individuals with multiple suicide attempts have a greater risk profile associated with subsequent suicide (e.g., Rudd et al., 1996). A limitation of the current study is that specific symptomatology such as hopelessness was not directly assessed by psychometrically robust measures. Instead, only information documented in records of those with a suicide attempt or a suicide death was obtained. As a result, the categorical record review variables can only be expected to provide a narrow perspective on the true characteristics of these individuals. Similarly, the retrospective cross-sectional design does not allow for a direct investigation of a cause and effect relationship, limiting the study's findings in relation to risk factors associated with multiple suicide attempts.

Strengths

Despite the limitations of this study, there are a number of strengths emphasizing the overall importance of this area of research. To the best of our knowledge, this is the first study of any population to investigate the differing characteristics of single versus multiple suicide attempt history among suicide decedents as well as among a psychiatrically hospitalized military population. Both studies performed were based on information collected within the DoD. The study makes adequate use of existing information collected in forensic and medical military settings to generate lessons learned. Study findings clearly demonstrate that clinically meaningful psychiatric differences exist among individuals with single versus multiple attempts and have important implications for future research and clinical practice in suicide prevention.

Future Research and Clinical Directions

Future research on suicide attempt status in the military will be imperative to continue to address this important research gap. First, it would be extremely useful to conduct a direct comparison of military versus civilian samples to fully understand if the single versus multiple suicide attempt status differences found as a result of this research are generalizable to the civilian suicidal individuals. Second, an adequately powered longitudinal study is expected to provide the best design to identify potential differences between single versus multiple attempt status suicidal patients and associated risk as well as protective factors.

Findings from this study do not answer the research question of whether individuals with single versus multiple suicide attempts who live or die after an attempt are all the same population. Beautrais (2001) sought to answer whether those with a serious suicide attempts were similar to those who died by suicide. Few differences between the two groups were found. However, differences between single versus multiple suicide attempt status (two possibly distinct subgroups), were not examined – thus leaving the question posed above still unanswered and in need of additional research.

One important recommendation for the DoD is to improve the surveillance efforts on suicide attempts, particularly collecting data on single versus multiple attempt status both in the context of suicide death investigations and in the context of behavioral health and primary care care. Having accurate knowledge of an individual's suicide attempt history will be critical to conceptualization and delivery of effective treatment. Differences between a first suicide attempt and a second or later attempt exist among individuals, indicating that treatment should also be different for those with differing suicide attempt histories.

To date, there is ample literature indicating that those with multiple suicide attempts versus single attempts present a more severe clinical picture – a factor that may increase risk for eventual death by suicide. One clinical implication may be that the more substantial the symptomatology, the more intense the treatment must be. Therefore, one long-term recommendation is to formulate evidence-informed clinical assessment and practice guidelines that take into account the unique needs of individuals with single versus multiple suicide attempts. However, to move in this direction, additional research in this area is much needed. Additionally, two additional clinically-related issues must be noted. First, in utilizing two different methodologies to look at suicide attempt status in military Service Members, our study team became familiar with documentation practices of medical providers within selected military inpatient and outpatient settings. An important piece of information for suicidal patients – specifically their history of suicide-related behaviors – was not consistently commented upon. Legally, if documentation does not exist, it simply implies that the information was not collected. Clinically, if documentation does not exist, it may imply that the provider did not assess or failed to document the results of his/her assessment. One important recommendation is that medical treatment facilities develop and implement a structured template for important clinical information that needs to be obtained from every single patient – especially those at risk for suicide and those psychiatrically hospitalized for a suicide-related event.

Finally, there is substantial evidence to indicate that differences exist among suicidal individuals with or without a prior suicide attempt. Yet, current clinical suicide risk assessment and management practices continue to primarily focus on the presenting

problem and psychiatric diagnosis of the patient. Clinicians, as a result, may be overlooking the various typologies or subgroups that may exist among those who are at risk for suicide and in fact, providing treatment services that are not tailored to the individual psychiatric history-related characteristics of their patients. Future work in enhancing services provided to suicidal patients must involve empirically-supported methods of screening and treating those with and without a suicide attempt history. However, a word of caution is also noted here. While suicide attempt history is a major red flag in suicide risk determinations, the current study shows that the majority of Service Members who died by suicide did not have a documented history of suicide attempt or even a recorded psychiatric diagnosis in their medical record. For this reason, clinicians cannot make the assumption that someone without a history of suicide attempt is not at risk for suicide and therefore, must be well-trained in assessing and managing risk within this important subset of the clinical population when these individuals present for primary and/or specialty care.

Tables and Figures

Table 1

Sample Cases of Suicide Demographic Characteristics (N = 217)

Characteristics	N	%
Demographic		
Age		
17 – 24 Years	75	34.6
25 – 34 Years	73	33.6
35 – 44 Years	53	24.4
45 – 54 Years	11	5.1
55 – 64 Years	2	0.9
Unknown	3	1.4
Gender		
Male	203	93.5
Female	14	6.5
Ethnicity		
Caucasian	168	77.4
African-American	26	12.0
Hispanic/Asian/Other	22	10.1
Unknown	1	0.5
Marital Status		
Married	105	48.4
Divorced/Separated/Widowed	39	18.1
Never Married	72	33.2
Rank		
E1 – E3	52	24.0
E4 – E6	120	55.3
E7 – E9	26	12.0
O1 – O3	8	3.7
O4 – O6	10	4.6
Unknown	1	0.5

Table 2

Sample Cases of Suicide Psychosocial and Psychiatric Characteristics (N = 217)

Characteristics	N	%
Psychosocial		

Interpersonal Stressors Within 3 Months	179	82.9
Legal Stressors Within 3 Months	74	34.1
Work Stressors Within 3 Months	90	41.5
Childhood Sexual Abuse	7	3.2
Psychiatric		
Alcohol Abuse	38	17.5
Alcohol Related Event	96	44.2
Drug Related Event	50	23.0
Mood Disorder	20	9.2
Anxiety Disorder	6	2.8
Adjustment Disorder	26	12.0
Substance Disorder	21	9.7
Other Axis I Disorder	10	4.6
Any Axis I Disorder	57	26.3
Personality Disorder NOS	5	2.3
Narcissistic Personality Disorder	1	0.5
Dependent Personality Disorder	3	1.4
Borderline Personality Disorder	0	0
Axis II Traits	4	1.8
Any Axis II Traits or Disorder	12	5.5

Table 3

Frequency of Demographic, Psychosocial, and Psychiatric Variables in Individuals with No Attempt History (n = 167) and a Suicide Attempt History (n = 50) in Cases of Suicide

Variables	No Attempt History (<i>n</i> = 167)		Suicide Attempt History (<i>n</i> = 50)		<i>X</i> ² (1)	<i>p</i> ^a
	<i>n</i>	%	<i>n</i>	%		
Demographic						
Age	167	77	50	23	-	.225 ^b
Male	157	94	46	92	-	.742 ^b
Race/Ethnicity	167	77	50	23	-	.645 ^b
Marital Status	167	77	50	23	-	.271 ^b
Paygrade	167	77	50	23	-	.957 ^b
Psychosocial						
Interpersonal Stressors Within 3 Months	133	80	46	92	4.07	.004
Legal Stressors Within 3	57	34	17	34	0.00	.986

Months						
Work Stressors Within 3 Months	66	40	24	48	1.14	.286
Childhood Sexual Abuse	6	4	1	2	-	1.00 ^b
Psychiatric						
Alcohol Abuse	26	16	12	24	1.89	.169
Alcohol Related Event	73	44	23	46	0.08	.775
Drug Related Event	38	23	12	24	0.03	.854
Mood Disorder	14	8	6	12	-	.415 ^b
Anxiety Disorder	4	2	2	4	-	.623 ^b
Adjustment Disorder	17	10	9	18	2.23	.135
Substance Disorder	15	9	6	12	-	.586 ^b
Other Axis I Disorder	8	5	2	4	-	1.00 ^b
Any Axis I Disorder	37	22	20	40	-	.017 ^b
Personality Disorder NOS	4	2	1	2	-	1.00 ^b
Narcissistic PD	1	1	0	0	-	1.00 ^b
Dependent PD	0	0	3	6	-	.012 ^b
Borderline PD	0	0	0	0	-	-
Axis II Traits	3	2	1	2	-	1.00 ^b
Any Axis II Traits or Disorder	8	5	4	8	-	.478 ^b

^a Chi-square or Fisher's exact tests (for analyses in which the expected count was less than 5 in 20% of cells).

^b Fisher's exact test.

Table 4

Summary of Logistic Regression Analysis Predicting Suicide Attempt History in Cases of Suicide

Variable	<i>B</i>	<i>SE</i>	<i>OR</i>	95% CI	Wald Statistic	<i>p</i>
Gender	-0.141	0.631	0.87	[0.25, 2.99]	0.05	.823
Any Axis I Disorder	0.80	0.35	2.23	[1.13, 4.41]	5.33	.021
Interpersonal Stressor within 3 Months	1.01	0.56	2.73	[0.91, 8.21]	3.21	.073

Table 5

Sample Cases of Suicide Attempt Demographic Characteristics (N = 423)

Characteristics	<i>N</i>	%
Demographic		
Age		
17 – 24 Years	244	57.7
25 – 34 Years	133	31.4
35 – 44 Years	37	8.7
45 – 54 Years	7	1.7
55 – 64 Years	2	0.5
Gender		
Male	263	62.2
Female	160	37.8
Ethnicity		
Caucasian	272	64.3
African-American	92	21.7
Hispanic/Asian/Other	59	13.9
Marital Status		
Married	152	35.9
Divorced/Separated/Widowed	61	14.4
Never Married	210	49.6
Rank		
E1 – E3	203	48.0
E4 – E6	183	43.3
E7 – E9	15	3.5
O1 – O3	12	2.8
O4 – O6	9	2.1
Unknown	1	0.2

Table 6

Sample Cases of Suicide Attempt Psychosocial and Psychiatric Characteristics (N = 423)

Characteristics	<i>N</i>	%
Psychosocial		
Interpersonal Trigger	288	68.1
Legal Trigger	38	9.0
Work Trigger	269	63.6
Childhood Sexual Abuse	86	20.3
Psychiatric		
Alcohol Trigger	47	11.1
Drug Trigger	9	2.1

Problem Substance Use	143	33.8
Mood Disorder	225	53.2
Anxiety Disorder	78	18.4
Adjustment Disorder	225	53.2
Substance Disorder	129	30.5
Other Axis I Disorder	25	5.9
Any Axis I Disorder	403	95.3
Personality Disorder NOS	101	23.9
Narcissistic Personality Disorder	4	0.9
Dependent Personality Disorder	3	0.7
Borderline Personality Disorder	49	11.6
Axis II Traits	114	27.0
Any Axis II Traits or Disorder	271	64.1

Table 7

Frequency of Demographic, Psychosocial, and Psychiatric Variables in Individuals with a Single Suicide Attempt (n = 256) and Multiple Suicide Attempt (n = 167) in Cases of Suicide Attempt

Variables	Single Suicide Attempt (<i>n</i> = 256)		Multiple Suicide Attempt (<i>n</i> = 167)		<i>X</i> ² (1)	<i>p</i> ^a
	<i>n</i>	%	<i>n</i>	%		
Demographic						
Age	256	61	167	39	-	.902 ^b
Male	160	63	103	62	0.03	.864
Race/Ethnicity	256	61	167	39	-	.819 ^b
Marital Status	256	61	167	39	-	.552 ^b
Paygrade	256	61	167	39	-	.781 ^b
Psychosocial						
Interpersonal Trigger	176	69	112	67	0.13	.716
Legal Trigger	26	10	12	7	1.09	.296
Work Trigger	164	64	105	63	0.06	.804
Childhood Sexual Abuse	43	17	43	26	5.00	.025
Psychiatric						
Alcohol Trigger	30	12	17	10	0.24	.622
Drug Trigger	6	2	3	3	-	1.00 ^b
Problem Substance Use	71	28	72	43	10.68	.001
Mood Disorder	122	48	103	62	7.98	.005

Anxiety Disorder	41	16	37	22	2.53	.111
Adjustment Disorder	145	57	80	48	3.10	.078
Substance Disorder	69	27	60	36	3.84	.050
Other Axis I Disorder	13	5	12	7	0.81	.369
Any Axis I Disorder	244	95	159	95	0.02	.961
Personality Disorder NOS	51	20	50	30	5.58	.018
Narcissistic PD	1	0	3	2	-	.305 ^b
Dependent PD	2	1	1	1	-	1.00 ^b
Borderline PD	28	11	21	13	0.27	.607
Axis II Traits	71	28	43	26	0.20	.653
Any Axis II Traits or Disorder	154	60	117	70	4.31	.038

^a Chi-square or Fisher's exact tests (for analyses in which the expected count was less than 5 in 20% of cells).

^b Fisher's exact test.

Table 8

Summary of Logistic Regression Analysis Predicting Suicide Attempt Status in Male Cases of Suicide Attempt

Variable	<i>B</i>	<i>SE</i>	<i>OR</i>	95% CI	Wald Statistic	<i>p</i>
Childhood Sexual Abuse	0.19	0.43	1.20	[0.52, 2.77]	0.19	.663
Problem Substance Use	0.89	0.31	2.43	[1.31, 4.50]	7.97	.005
Mood Disorder	1.06	0.34	2.88	[1.49, 5.59]	9.83	.002
Adjustment Disorder	0.22	0.34	1.25	[0.64, 2.43]	0.44	.510
Substance Disorder	0.13	0.32	1.14	[0.61, 2.12]	0.16	.688
Personality Disorder NOS	0.51	0.34	1.66	[0.85, 3.23]	2.24	.135
Any Axis II Trait or Disorder	0.52	0.33	1.69	[0.89, 3.19]	2.58	.108

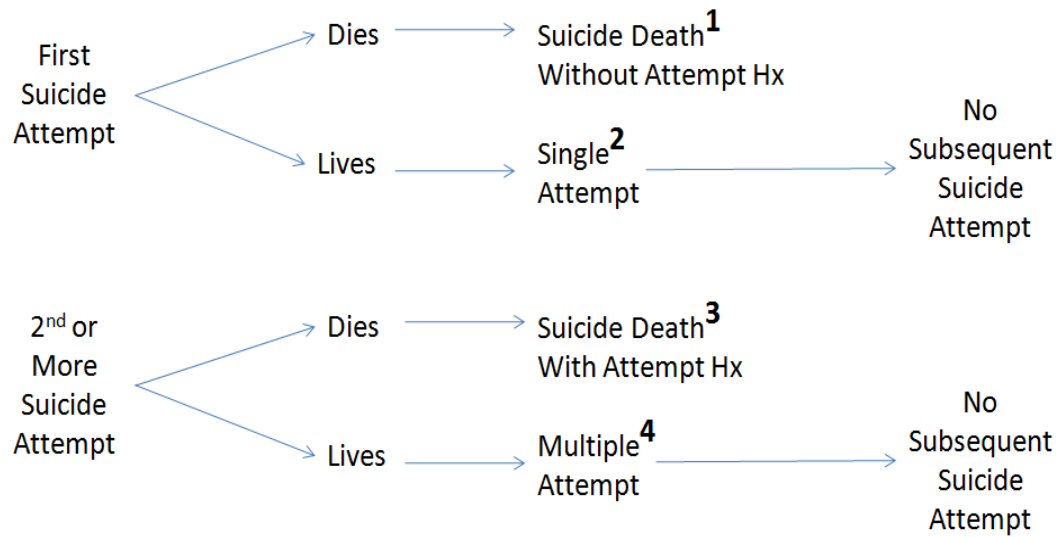
Table 9

Summary of Logistic Regression Analysis Predicting Suicide Attempt Status in Female Cases of Suicide Attempt

Variable	<i>B</i>	<i>SE</i>	<i>OR</i>	95% CI	Wald	<i>p</i>
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					Statistic	
Childhood Sexual Abuse	0.750	0.339	2.12	[1.09, 4.11]	4.91	.027

Figure 1

Suicide Attempt Trajectories

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